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ABSTRACT

Presented is an updated version of a previous bibliography prepared by the Minnesota State Energy Agency. The materials included in this document are indexed according to grade level and according to whether they are background materials or classroom activities. Each of the items listed were evaluated and included into either the "A" list or the "B" list. The "A" list contains activities and background materials that were judged to be somewhat better by virtue of: (1) content included; (2) activities; (3) ease of use; (4) background materials; and/or (5) reference provided. The "B" list contains activities and background materials which cover a wider range of subjects and approaches and may be used as the core of or as supplements to energy units. In addition to the usual bibliographic information such as title, author, publisher/source, other information included is: (1) suggested grade levels; (2) suggested subject areas; (3) media type; (4) cost and date issued; (5) types of activities; (6) energy topics; (7) approaches; (8) student outcomes; (9) what teacher background is assumed; and (10) general comments. Also indicated is whether materials are designed for use by students, teachers or both. (MR)

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INTRODUCTION

This is an update of the June, 1978 *Energy Education Materials Bibliography* that was mailed to all the elementary and secondary schools in Minnesota.

Some of the criteria used while reviewing the materials have been noted on the page titled Criteria for Reviewing Energy Materials, which has been printed here to provide a check list format for teachers reviewing other energy materials.

If the material is in a format which the students will read or view directly, it is designated as Student Material. If it is in a format where the teacher explains activities and concepts to the group (such as Teacher's Guide) it is classified as a Teacher Resource. Some media packages contain both student and teacher materials. Other materials are designated as General Information: these are not specifically classroom-oriented.

The Approaches section notes whether the material is sequenced, open-ended, value-clarification, etc. Some of the emphases and biases of the material are noted.

The Student Outcomes in many of the materials are not clearly identified. If the outcomes are identified, the evaluation indicates whether they are cognitive or affective.

The Teacher Background Assumed section tries to identify extra background a teacher might need for the material, and suggests types of support materials, if applicable. It also identifies background information (diagrams, glossary, bibliography) found in the material.

Many teachers requested that the "best energy curriculum materials" be identified. To meet this request, the evaluated materials have been divided into two lists, each identifying curriculum activities and background materials. These lists should not be taken as unchangeable, for obviously no single set of materials will be "best" for every school class in the state.

In general, the "A" list contains materials judged to be somewhat better by virtue of content included, activities, ease of use, background material, and/or references provided. Most "A" list materials demand little or no extra teacher background. This list provides a starting point for energy activities and background information.

The "B" list, however, also contains many useful materials which could be used as the core of, or as supplements to, an energy unit. It contains a wider range of subjects, approaches, and types of materials. Some of these demand more teacher background or more back-up materials in the classroom. The "B" list also contains items identified as representing specific points of view (oil company, consumer advocate, etc.) which would be important in values and lifestyle discussions. Teachers putting together a larger unit on energy are strongly encouraged to review the "B" list.

The Energy Agency recently transferred a collection of energy films and filmstrips to the audio-visual library of the Department of Natural Resources. For a listing of available films, contact the Minnesota Energy Agency. To book films, contact the Film Loan Library, Department of Natural Resources, Centennial Office Building, 658 Cedar Street, St. Paul, Minnesota 55155.

CRITERIA FOR REVIEWING ENERGY MATERIALS

A. Point of View

1.) What is the bias of the material? (Check the source, read the information about the author. What were the author's previous works? Who funded the curriculum development and for what purpose?)

2.) Does the material claim to be exploring both sides of a controversial issue? How balanced is the presentation? Would it be better to go to original sources with the conflicting points of view than to stop with material that tries to represent both?

3.) Are any specific values espoused? What are they? Are they controversial? (Even energy conservation can be controversial. Think of recycling, carpooling, etc.)

4.) Do the authors make any general assumptions or take things for granted?

B. Content of Materials

1.) Does the material approach energy from the physical science aspect (what is energy?), the social sciences aspect (how does energy affect our society?), or a combination of these? Does it represent the environmental, economic and social aspects of the problem?

2.) What are the main topics of the material?

3.) How complete is the material?

4.) Are sources of data reliable, accurate, up-to-date?

C. Background

1.) What background is assumed for the class?

2.) What background is assumed for the teacher?

3.) What support materials are necessary to use this material well?

4.) Is it compatible with teaching methods used in your classroom?

5.) Is there a bibliography in the material?

D. Presentation

1.) Are concepts, vocabulary, activities and presentation consistent for the stated grade level?

2.) Are sources cited in the material for the major assertions and assumptions?

3.) Is enough information given to guide the teacher through suggested activities?

4.) What techniques are used to get the material's point of view across?

"A" LIST

ACTIVITIES

The annotated descriptions are arranged alphabetically in two sections: Activities and Background Material.

K-12

Recyclopedia (Simons)
Solar Energy Education Packet (Center for Renewable Resources)
Staples Energy Conservation Program (Gildow et. al.)

Elementary

Do It Yourself Guide to an Energy Seminar (Quarry Hill Nature Center)
Energy Education in Elementary Science (Mpls. Public Schools — writing team)
Energy Education in Elementary Social Studies (Mpls. Public Schools — writing team)
Exploring with Solar Energy (Metos & Bitter)
Putting the Sun to Work (Bendick)
Tapping the Earth's Heat (Lauber)

Junior High and Up

Basic Teaching Units (BTU's) *on Energy* (Lay & McCurdy)
Do It Yourself Guide to an Energy Seminar (Quarry Hill Nature Center)
Exploring with Solar Energy (Metos & Bitter)
Solar Energy (Branley)
Solar Energy (Hoke)
Solar Energy Project (N.Y. Education Department et. al.)

Senior High and Up

Energy Management Game (Biological Sciences Curriculum Study)
Exploring Alternative Energy Systems (Anway, Schneiderwent & Overn)
Practical Sun Power (Rankins III & Wilson)
Understanding Solar Energy Systems (Keaton, Edington & Stephey)

"B" LIST

ACTIVITIES

The annotated descriptions are arranged alphabetically in two sections: Activities and Background Material.

Elementary

A Curriculum Activities Guide to Electric Power Generation and the Environment (Project K.A.R.E.)
Energy Activities and Coloring Book (K-3), Solar-Ed. Corp.)
Energy Packet (Massachusetts Audubon Society)
Everyday Conservation (Instructor Curriculum Materials)
Handbook of Energy Lesson Plans (H.E.L.P.), (The Cooper Solar Group Companies)
Teaching About Energy Awareness (Dillie)

Junior High and Up

A Curriculum Activities Guide to Electric Power Generation and the Environment (Project K.A.R.E.)
Energy Packet (Massachusetts Audubon Society)
The Environment: Activities and Exploration: Unit Six: Understanding our Energy Needs (Brenchly & Tower)
Handbook of Energy Lesson Plans (H.E.L.P.), (The Cooper Solar Group Companies)
Teaching About Energy Awareness (Nancy Dille)

Senior High and Up

Introduction to Energy (Posthuma)
The Energy Crisis: What Are Our Choices (Buggey & Tyler)

"A" LIST

BACKGROUND

The annotated descriptions are arranged alphabetically in two sections: Activities and Background Material.

Elementary

Saving Electricity (Sam and Beryl Epstein)

Junior High

Energy: A Growing National Problem (National Wildlife Federation)

Senior High

Catch the Wind: A Book of Windmills and Wind Power (Dennis)
Energy: From Source to Use (Stoker, Seager, Capener)
Energy Dilemmas (League of Women Voters Education Fund)
Energy Options (League of Women Voters Education Fund)
Energy Primer (Merrill & Gage)
In Search of an Energy Policy (Willard)
The Woodburner's Encyclopedia (Shelton & Shapiro)

"B" LIST

BACKGROUND

The annotated descriptions are arranged alphabetically in two sections: Activities and Background Material.

Elementary

How Did We Find Out About Nuclear Power (Asimov)

Junior High and Up

Careers in the Energy Industry (Kraft)
Coal: Energy and Crisis (Chaffin)
Eco-tips (Concern, Inc.)
Energy and Our Future (Oxenhorn)
From Fossils to Fuels (Hershell and Joan Lowery Nixon)
Going, Going, Gone] The Waste of Our Energy Resources (Marshall)
How Did We Find Out About Nuclear Power (Asimov)
Oil and Natural Gas (Kraft)
The Quest for Oil (Roberts)
The Race for Electric Power (Grey)

Senior High and Up

The Homebuilt Wind-Generated, Electricity Handbook (Hackleman)

College and Adult

Contemporary Chemistry: Science, Energy, and Environmental Change (Wade)

ACTIVITIES

ACTIVITIES

ENERGY MATERIALS EVALUATION

Title: Basic Teaching Units (BTU's) on Energy

Author: Gary A. Lay & Dr. Donald McCurdy (ed.) **Issue Date:** 1979

Suggested Grade Levels: jr. — sr. high (ed.)

Suggested Subject Areas: physical sciences, social studies, home economics, industrial arts, economics, math, agriculture

Media Types: package of 22 units

Teacher Resource

Cost: Approx. $20.00

Source: Nebraska Energy Office, Box 95085, Lincoln, Neb. 68509

Energy Topics: use, conservation, sources, economics, agriculture, electricity, future, food, food preparation

Types of Activities: experiments, projects, discussions

Approaches: strongly expresses size of problem and great need for conservation and individual involvement. Units are diverse, self-contained, and relevant to specific subject areas.

Student Outcomes: Clearly Stated? Yes **Areas:** Cognitive; Affective

What Teacher Background is Assumed? varies with unit. Many experiments assume experience supervising science labs. Much background information is included.

Other/General Comments: a broad range of ideas, well worth looking through. Some units present only one point of view on controversial topics (such as nuclear). Many hands-on activities are included.

Title: A Curriculum Activities Guide to Electric Power Generation and th e Environment.

Author: Project K.A.R.E. **Issue Date:** 1975

Suggested Grade Levels: 4 — 12

Suggested Subject Areas: biology, chemistry, social studies, industrial arts, consumer education

Media Types: 145 page booklet

Teacher Resource

Cost: $5.50

Source: Project K.A.R.E., Colony Office Bldg., Rte. 73 & Butler Pike, Blue Bell, PA 19422

Energy Topics: Energy and the Consumer, Energy and Water Pollution, Energy and Air Pollution

Types of Activities: discussions, experiments, surveys

Approaches: Teachers were asked to design activities for the 3 topics noted above. Their write-ups, with comments from course instructors, are included.

Student Outcomes: Clearly Stated? No

What Teacher Background is Assumed? varies with activity. Some assume no background.

Other/General Comments: This collection contains some very interesting activities. Its main disadvantage is the need to go through the book page by page to find them, due to a lack of grade or subject area index.

ENERGY MATERIALS EVALUATION

Title: Do It Yourself Guide to an Energy Seminar

Author: Quarry Hill Nature Center

Suggested Grade Levels: Grade 5 — high school

Suggested Subject Areas: science

Media Types: 15 page pamphlet

Teacher Resource

Cost: Free

Source: available from Minnesota Environmental Education Board (MEEB), Centennial Office Building — 658 Cedar Street — St. Paul, Minnesota 55155

Energy Topics: insulation, fuel use, types of energy, heat, solar

Types of Activities: constructing learning stations

Approaches: This pamphlet tells in detail how to construct 10 learning stations on energy, suitable for classrooms or energy fairs.

Student Outcomes: Clearly Stated ? No

What Teacher Background is Assumed? no special background assumed, but there should be stronger warning statement about use of Fresnel lens

Other/General Comments: good collection of learning stations and experiments

Title: Energy Activities and Coloring Book

Author: Solar-Ed. Corp. **Issue Date:** 1978

Suggested Grade Levels: primary

Suggested Subject Areas: general information

Media Types: short, unpaged booklet

Student Material

Cost: $2.00

Source: Solar Ed. Corp., Energy Curriculum Materials, 1627 Litchfield Turnpike, P.O. Drawer X — Woodbridge, CT 06525

Energy Topics: various forms of solar energy

Types of Activities: cutouts, mazes, pictures to color, experiments

Approaches: These brief, unsequenced activities could be used as a supplement to solar energy discussions

Student Outcomes: Clearly Stated? No

What Teacher Background is Assumed? none

Other/General Comments: The book's main value may be that it provides pictures and patterns which could be copied for use with a class.

ENERGY MATERIALS EVALUATION

Title: The Energy Crisis

Author: D. L. Bender, G. E. McCuen **Issue Date:** 1973

Suggested Grade Levels: high school & up

Suggested Subject Areas: social studies

Media Types: pamphlet, 32 pages

Student Material

Cost: $.98

Source: Greenhaven Press, Inc., 1611 Polk St. N.E. Minneapolis, Minnesota 55432

Energy Topics: energy crisis, nuclear power safety

Types of Activities: discussion

Approaches: presents 2 sets of articles with opposing views presented in each set; also provides guidelines for analyzing points of view

Student Outcomes: Clearly Stated? Outcomes are primarily in reading and analysis skills, using energy controversies as a vehicle.

What Teacher Background is Assumed? further discussion of content of articles would demand support materials providing more information.

Other/General Comments: The focus of this pamphlet is analysis of opposing viewpoints. The articles chosen remain timely, but demand good reading skills. This could be the basis of excellent exercises in critical reading, and values explorations.

Title: The Energy Crisis: What Are Our Choices

Author: JoAnne Buggey & June Tyler **Issue Date:** 1976

Suggested Grade Levels: high school, college

Suggested Subject Areas: social studies, language arts

Media Types: 118 page paperback

Student Material

Cost: $4.32

Source: Prentice-Hall, Inc., Englewood Cliffs, N.J.

Energy Topics: who is to blame for energy crisis, present and future alternatives

Types of Activities: discussions, writing, analyzing & comparing

Approaches: presents articles with conflicting views, and follows them with study questions

Student Outcomes: Clearly Stated? No

What Teacher Background is Assumed? Background varies with different articles. Some over-simplify. The book might be used to start discussions, then lead to outside corroborating references.

Other/General Comments: a well-organized set of articles; environmental point of view under-represented in section on causes of the crisis.

ENERGY MATERIALS EVALUATION

Title: Energy Education in Elementary Science

Author: Mpls. Public Schools — writing team **Issue Date:** 1978

Suggested Grade Levels: K — 6

Suggested Subject Areas: science

Media Types: 2 packets, one to accompany SCIS materials, one to accompany ESS. Available separately.

Teacher Resource

Cost: free

Source: MN Energy Agency, Information and Education, 150 East Kellogg Blvd., St. Paul, MN 55101

Energy Topics: definitions and properties of energy, society's dependence on energy, possible solutions, Minnesota energy issues

Types of Activities: ESS unit includes several experiments; SCIS unit identifies activities already in SCIS units

Approaches: Both guides identify energy topics in existing curriculum materials. The ESS unit expands the existing units with several experiments which are similar in format to those in existing materials

Student Outcomes: Clearly Stated? No **Areas:** Cognitive

What Teacher Background is Assumed? These assume familiarity with the ESS or SCIS curriculum materials.

Other/General Comments: Both guides include outline of Energy Education Topics produced by Minnesota Dept. of Education, and key their matrices of topics in the units to this outline. They can provide teachers interested in energy with a fast way to locate energy-related concepts in existing materials.

Title: Energy Education in Elementary Social Studies

Author: Mpls. Public Schools — writing team **Issue Date:** 1979

Suggested Grade Levels: 1 — 6

Suggested Subject Areas: social studies

Media Types: 2 booklets, one to accompany *Windows on Our World* (Houghton Mifflin), one to accompany *Holt Databank System* (Holt, Rinehart & Winston) (available separately)

Teacher Resource

Cost: Free

Source: MN Energy Agency, Information and Education, 150 East Kellogg Blvd., St. Paul, MN 55101

Energy Topics: definitions and properties of energy, society's dependence on energy, possible solutions, Minnesota's energy issues

Types of Activities: 19 suggested activities are added. See "Approaches" below.

Approaches: These guides use an outline of Energy Education Topics developed by the Minnesota Department of Education to identify on a matrix the related units in the different curriculum sets, and annotates the references on the matrix.

Student Outcomes: Clearly Stated? No

What Teacher Background is Assumed? These assume familiarity with the principal curriculum materials being reviewed.

Other/General Comments: This provides a fast way for teachers interested in energy concepts to locate them in existing curriculum materials, and can help plan an integrated energy unit.

ENERGY MATERIALS EVALUATION

Title: Energy Management Game

Author: Biological Sciences Curriculum Study **Issue Date:** 197/

Suggested Grade Levels: high school to adult

Suggested Subject Areas: social studies, economics, futures

Media Types: game with game board, pieces for 4-6 players

Student Material

Cost: $35.00

Source: Hubbard, P.O. Box 104, Northbrook, Ill. 60062

Energy Topics: electric energy supply, demand, cost, policy making

Types of Activities: board game that involves predicting and manipulating energy supply, demand, and policies

Approaches: Players all act the part of electric utility heads, and make group and individual decisions while trying to reduce demand, increase supply, and make money.

Student Outcomes: Clearly Stated? No

What Teacher Background is Assumed? not much assumed

Other/General Comments: The game provides an interesting look at problems of supplying power.

Title: Energy Packet

Author: Massachusetts Audubon Society **Issue Date:** 1974

Suggested Grade Levels: upper elementary — jr. high

Suggested Subject Areas: science, social studies, general info.

Media Types: packet with several copies of *Curious Naturalist,* pamphlets, reprints

Teacher Resource; Student Material

Cost: $5.00

Source: Massachusetts Audubon Society, Lincoln, MA 01773

Energy Topics: food energy, energy in nature, fossil fuels, future choices

Types of Activities: simple experiments

Approaches: The articles can be used separately or in a sequence to give a good overview of energy basics. In sections dealing with nuclear, the problems are emphasized.

Student Outcomes: Clearly Stated? No

What Teacher Background is Assumed? several pieces of background reading, plus bibliographies, are provided for the teacher

Other/General Comments: This is a good, useful package. Concepts are well stated. Some groups may have trouble reading the articles, and need teacher's help. Energy bibliographies included are somewhat dated (1974).

ENERGY MATERIALS EVALUATION

Title: The Environment: Activities and Explorations: Unit Six: Understanding Our Energy Needs

Author: David Brenchly & John Tower **Issue Date:** 1975

Suggested Grade Levels: jr. — sr. high

Suggested Subject Areas: social studies, American studies, futures, science

Media Types: ditto master package, teacher guide, resource handbook

Teacher Resource

Cost: $18.00

Source: Houghton-Mifflin Co., 1900 S. Batavia Avenue, Geneva, Illinois 60134

Energy Topics: use, conservation, policy, nature of energy

Types of Activities: surveys, discussion question

Approaches: emphasizes looking at life-styles, value choices, and how these influence energy uses and policies

Student Outcomes: Clearly Stated? Yes **Areas:** Cognitive; Affective

What Teacher Background is Assumed? Teacher guide contains much background information plus suggested resources.

Other/General Comments: This set concentrates on discussion questions and problems, some of which are very well put.

Title: Everyday Conservation

Author: Instructor Curriculum Materials **Issue Date:** 1977

Suggested Grade Levels: 1 — 6

Suggested Subject Areas: general information

Media Types: 8 posters, set of activity cards

Student Material

Cost: $5.95

Source: Instructor Publications, Dansville, NY 14437

Energy Topics: conservation habits

Types of Activities: short projects derived from posters

Approaches: Each poster shows a specific conservation habit, such as keeping heat low, and has an activity card referring to it.

Student Outcomes: Clearly Stated? No

What Teacher Background is Assumed? What Teacher Background is Assumed? none assumed

Other/General Comments: The posters could be used well in a unit on energy. The energy conservation topics include recycling, food waste, water use, electricity and personal belongings.

ENERGY MATERIALS EVALUATION

Title: Exploring Alternative Energy Systems

Author: Dr. Allen Anway, Dr. Myron Schneiderwent, William Overn **Issue Date:** 1978

Suggested Grade Levels: high school

Suggested Subject Areas: physics, industrial arts

Media Types: book of lesson plans that goes with various experimental equipment

Student Material

Cost: $6.95

Source: Technical Systems, Inc., 2256 Terminal Rd., St. Paul, MN 55113

Energy Topics: thermal, solar electric, water, wind, chemical

Types of Activities: Each of the topics noted above has a module of equipment for various experiments.

Approaches: The book has specific problems and instructions for the student and accompanies equipment sold by T.S.I.

Student Outcomes: Clearly Stated? Yes **Areas:** Cognitive

What Teacher Background is Assumed? familiarity with principles of physical science, and lab supervision

Other/General Comments: These models offer a good way for students to become familiar with principles behind various alternative sources of energy.

Title: Exploring with Solar Energy

Author: Thomas H. Metos & Gary G. Bitter **Issue Date:** 1978

Suggested Grade Levels: grade 5 — jr. high

Suggested Subject Areas: science, general information

Media Types: 64 page book

Student Material

Source: Simon & Schuster, 1 West 39 Street, New York, N.Y. 10018

Energy Topics: general principles of solar energy

Types of Activities: several experiments

Approaches: gives some background and leads up to several simple experiments

Student Outcomes: Clearly Stated? No

What Teacher Background is Assumed? no special background is assumed

Other/General Comments: General experiments are quite good. However, the teacher should emphasize great caution for those using Fresnel lens. Students should handle materials with tongs, not hands, as is shown in picture.

ENERGY MATERIALS EVALUATION

Title: Handbook of Energy Lesson Plans (H.E.L.P.)

Author: The Cooper Solar Group Companies **Issue Date:** 1977

Suggested Grade Levels: 4 — College

Suggested Subject Areas: science, industrial arts

Media Types: 4 notebooks: Elementary, Jr. High, Sr. High, College

Teacher Resource

Cost: $3.00

Source: The Cooper Solar Group Companies, 1627 Litchfield Turnpike, P.O. Drawer X, Woodbridge, CT 06525

Energy Topics: principles of solar energy and use

Types of Activities: experiment, discussion

Approaches: uses experiments and step-by-step calculations to explain solar principles

Student Outcomes: Clearly Stated? No

What Teacher Background is Assumed? experience in setting up and supervising science labs

Other/General Comments: Interesting set of experiments. Some of those designated for lower grades may be more appropriate for later grades.

Title: Introduction to Energy

Author: Fred Posthurna **Issue Date:** 1978

Suggested Grade Levels: secondary

Suggested Subject Areas: industrial arts, general minicourse on energy

Media Types: 90 page book, booklet of duplicating master patterns

Teacher Resource

Cost: $6.50

Source: Wisconsin Vocational Studies Center, 964 Education Sciences Building, 1025 W. Johnson St., Madison, WI 53706

Energy Topics: supply, sources, demand, environmental problems, use

Types of Activities: worksheets, with hands-on activities suggested in a general list at the end

Approaches: gives lesson plan outlines for an energy course which concentrates on giving general background

Student Outcomes: Clearly Stated? Yes **Areas:** Cognitive; Affective

What Teacher Background is Assumed? very little assumed

Other/General Comments: worksheet patterns taken from *The Energy Challenge.* Though the author says the book is for industrial arts, its concentration on giving background information, with few activities, would make it appropriate for other disciplines.

ENERGY MATERIALS EVALUATION

Title: Practical Sun Power

Author: Wm H. Rankins III, David A. Wilson **Issue Date:** 1974

Suggested Grade Levels: *high school, adult*

Suggested Subject Areas: industrial arts, general information

Media Types: 52 page booklet

General Information

Cost: $4.00

Source: Lorien House, P.O. Box 1112, Black Mtn, NC 28711

Energy Topics: solar projects with principles of why they work

Types of Activities: plans for solar oven, solar cookers, hot water heaters, solar collectors, and other smaller projects

Approaches: gives detailed directions on building different projects

Student Outcomes: Clearly Stated? No

What Teacher Background is Assumed? some familiarity with working with tools

Other/General Comments: good, hands-on projects

Title: Putting the Sun to Work

Author: Jeanne Bendick **Issue Date:** 1979

Suggested Grade Levels: 3 — 6

Suggested Subject Areas: general interest, science

Media Types: 64 page book

Student Material

Cost: $4.74

Source: Garrard Publishing Co., 107 Cherry Street, New Canaan, Ct. 06840

Energy Topics: principles of solar energy

Types of Activities: some simple experiments

Approaches: optimistic review of solar energy

Student Outcomes: Clearly Stated? No

What Teacher Background is Assumed? none assumed

Other/General Comments: good introduction to solar; contains many complex ideas stated briefly; teacher help may be needed on some of these concepts.

ENERGY MATERIALS EVALUATION

Title: Recyclopedia

Author: Robin Simons

Suggested Grade Levels: K — 12

Suggested Subject Areas: science, art, home economics, language arts

Media Types: 118 page book

Teacher Resource; Student Material

Cost: $6.95

Source: Houghton Mifflin, 1900 S. Batavia Ave., Geneva, Il 60134

Energy Topics: projects and crafts using recycled materials

Types of Activities: all sorts of experiments, games and projects

Approaches: This came out of a project at the Boston Children's Museum, and encourages creativity with discarded materials.

Student Outcomes: Clearly Stated? No

What Teacher Background is Assumed? none assumed

Other/General Comments: Though the focus of the book is not really energy, there are many delightful projects which can be done with recycled materials, and can be related to energy and materials waste.

Title: Solar Energy

Author: Franklyn M. Branley **Issue Date:** 1975

Suggested Grade Levels: jr. — sr. high

Suggested Subject Areas: general information

Media Types: 118 page book

Student Material

Cost: $5.50

Source: Harper & Row, 10 East 53 Avenue, New York, N.Y. 10022

Energy Topics: definitions, sources, solar projects, solar design, future possibilities

Types of Activities: some solar projects and simple experiments

Approaches: gives background on principles of solar energy use, and encourages simple experimenting.

Student Outcomes: Clearly Stated? No

What Teacher Background is Assumed? The book can be used as an introduction, or to encourage projects for those already interested. Not much background is assumed. More diagrams would be helpful.

Other/General Comments: a good overview of solar energy

ENERGY MATERIALS EVALUATION

Title: Solar Energy

Author: John Hoke **Issue Date:** revised 1978

Suggested Grade Levels: 8 and up

Suggested Subject Areas: science

Media Types: 90 page book

Student Material

Cost: $3.45

Source: Franklin Watts Publ., 730 Fifth Ave., NY, NY 10019

Energy Topics: solar principles, solar cells, future of solar energy use

Types of Activities: some projects using solar cells and small motors

Approaches: The book is very optimistic about solar energy. It gives brief histories of different solar applications, and much detail on principles of various uses.

Student Outcomes: Clearly Stated? No

What Teacher Background is Assumed? Projects assume some familiarity with tools and motors. The book covers some of the background material rather briefly.

Other/General Comments: a good overview on solar energy, concentrating on details of principles and use of solar cells

Title: Solar Energy Education Packet

Author: Center for Renewable Resources **Issue Date:** 1979

Suggested Grade Levels: K — 12

Suggested Subject Areas: all subjects

Media Types: 59 page booklet

Teacher Resource

Cost: $3.75 plus postage

Source: Center for Renewable Resources, 1001 Connecticut Ave. N.W., Washington D.C. 20036

Cost: Free

Source: Minnesota Energy Agency, 980 American Building, 150 East Kellogg Boulevard, St. Paul, Minnesota 55101

Energy Topics: principles of solar use, solar vocabulary and definitions, background articles

Types of Activities: experiments, discussions, art projects

Approaches: intersperses sections of background material with activities. This is a compilation of activities used all over the country.

Student Outcomes: Clearly Stated? No

What Teacher Background is Assumed? varies with activity. In general, not much assumed.

Other/General Comments: a good resource for teachers

ENERGY MATERIALS EVALUATION

Title: Solar Energy Project

Author: New York State Education Department and Atmospheric Science Research Center, State University of N.Y. at Albany **Issue Date:** 1979

Suggested Grade Levels: Grade 7 — 12

Suggested Subject Areas: General Science, Earth Science, Biology, Chemistry, Physics, Industrial Arts

Media Types: 7 booklets, available separately

Teacher Resource; Student Material

Cost: $18.60/set (can purchase separately)

Source: Debra Langford, Office of Conservation and Solar Applications, Department of Energy, 20 Massachusetts Avenue N.W., Washington D.C. 20585

Energy Topics: solar principles, storage, comparison of different collectors.

Types of Activities: projects, experiments, demonstrations

Approaches: uses experiments to get students involved in learning principles of solar energy

Student Outcomes: Clearly Stated? Yes **Areas:** Cognitive

What Teacher Background is Assumed? experience in supervising labs

Other/General Comments: very good set of activities

Title: Staples Energy Conservation Program

Author: Staples teachers & consultants, Ray Gildow et. al. **Issue Date:** 1978

Suggested Grade Levels: K — 12

Suggested Subject Areas: social studies, industrial arts, agriculture, language arts, math, home economics

Media Types: 10 notebooks and folders of activities

Teacher Resource

Cost: $90.00

Source: Staples Independent School District #793, Staples, MN 56479

Energy Topics: definitions, forms, sources, uses, energy storage, networks, costs, priorities, trends

Types of Activities: experiments, discussions, games, classroom projects, worksheets

Approaches: strongly promotes conservation; gets students to explore their own actions and values; contains many different types of activities for different subjects

Student Outcomes: Clearly Stated? Yes **Areas:** Cognitive

What Teacher Background is Assumed? none assumed

Other/General Comments: lots of ideas, laid out in a way teachers can use easily

ENERGY MATERIALS EVALUATION

Title: Tapping the Earth's Heat

Author: Patricia Lauber **Issue Date:** 1978

Suggested Grade Levels: 3 — 6

Suggested Subject Areas: science, general information

Media Types: 64 page book

Student Material

Cost: $4.74

Source: Garrard Publishing Co., 107 Cherry Street, New Canaan, CT. 06840

Energy Topics: principles of geothermal energy

Types of Activities: some simple experiments

Approaches: optimistic view of geothermal energy

Student Outcomes: Clearly Stated? No

What Teacher Background is Assumed? none assumed

Other/General Comments: good introduction to geothermal. Some children will need help reading this.

Title: Teaching About Energy Awareness: 33 Activities

Author: Nancy Dille, Editor **Issue Date:** 1978

Suggested Grade Levels: 5 — 12

Suggested Subject Areas: social studies, home economics, science, govt., economics, language arts

Media Types: 180 page notebook

Teacher Resource

Cost: $7.95

Source: Center for Teaching, International Relations, University of Denver (Colorado Seminary), Denver, Colorado 80208

Energy Topics: energy use, conservation, alternative sources, environment

Types of Activities: discussions, short activities, surveys, class projects

Approaches: The emphasis is on individuals exploring their own energy use and values.

Student Outcomes: Clearly Stated? Yes **Areas:** Cognitive; Affective

What Teacher Background is Assumed? background varies with activity. In general, little background is needed. A background section on alternative sources of energy is provided. (It is pessimistic about nuclear).

Other/General Comments: This is a mixed collection of activity ideas. It is worth reviewing.

ENERGY MATERIALS EVALUATION

Title: Understanding Solar Energy Systems

Author: Laurie Keaton, Everett Edington, Mark Stephey **Issue Date:** 1978

Suggested Grade Levels: high school & up

Suggested Subject Areas: industrial/vocational, physical sciences

Media Types: 128 pg. booklet

Teacher Resource

Cost: $7.00

Source: Wisconsin Vocational Studies Center, Univ. of Wisconsin-Madison, 1025 W. Johnson St., Madison, Wisconsin

Energy Topics: principles of solar energy, different types of systems, heat storage & distribution

Types of Activities: making and experimenting with collectors, discussion questions, other experiments

Approaches: combines background information with hands-on activities

Student Outcomes: Clearly Stated? Yes **Areas:** Cognitive

What Teacher Background is Assumed? familiarity with principles of solar heating

Other/General Comments: good, practical introduction to solar

BACKGROUND

ENERGY MATERIALS EVALUATION

Title: Careers in the Energy Industry

Author: Betsy Harvey Kraft **Issue Date:** 1977

Suggested Grade Levels: Jr. High

Suggested Subject Areas: Careers

Media Types: 68 pg. hardback book

Student Material

Cost: $4.47

Source: Franklin Watts, 730 Fifth Avenue, New York, N.Y. 10019

Energy Topics: different jobs available in different energy fields — fossil fuels, nuclear power, electricity, government.

Types of Activities: none

Approaches: Careers in each industry are described very briefly, with some specific suggestions for high school and college preparation.

Student Outcomes: Clearly Stated? No

What Teacher Background is Assumed? none needed

Other/General Comments: This is a brief overview that mentions many possible careers in energy. Because it is little more than a list, it would probably need much material that gives more detail if a unit were planned.

Title: Catch the Wind: A Book of Windmills and Wind Power

Author: Landt Dennis **Issue Date:** 1976

Suggested Grade Levels: High school, adult (possibly jr. high)

Suggested Subject Areas: general information

Media Types: 114 page hardback book

General Information

Cost: $8.95

Source: Four Winds Press, 50 West 44th, N.Y., N.Y.

Energy Topics: wind power, history, current innovations, future role in meeting energy needs

Types of Activities: none

Approaches: very optimistic about future potential for wind power in supplying part of our energy

Student Outcomes: Clearly Stated? No

What Teacher Background is Assumed? none

Other/General Comments: very interesting, attractive book (lots of pictures); a good historical introduction to windpower

ENERGY MATERIALS EVALUATION

Title: Coal: Energy and Crisis

Author: Lillie D. Chaffin **Issue Date:** 1974

Suggested Grade Levels: jr. high (possibly 5-6)

Suggested Subject Areas: science, general info.

Media types: 48 pg. hardback book

Student Material

Cost: $3.99

Source: Harvey House, 20 Waterside Plaza, New York, N.Y. 10010

Energy Topics: coal formation, historical use, coal mining, social impact of coal mining and use, environmental and health problems

Types of Activities: none

Approaches: emphasizes problems of coal mining and use

Student Outcomes: Clearly Stated? No

What Teacher Background is Assumed? none

Other/General Comments: presents a lot of information briefly; demands good reading skills; says Florida (rather than Minnesota) has largest peat beds

Title: Contemporary Chemistry: Science, Energy, and Environmental Change

Author: Charles G. Wade **Issue Date:** 1976

Suggested Grade Levels: college, adult

Suggested Subject Areas: environmental studies, chemistry

Media Types: 457 pg. textbook

Student Material; General Information

Cost: $16.95

Source: MacMillan Publishing Co., 866 Third Ave., NY, NY 10022

Energy Topics: uses, sources, laws of thermodynamics, definitions, controversies, future options, conservation, costs

Types of Activities: discussion questions

Approaches: Energy is only one topic handled in a comprehensive environmental studies text. Chemistry is used as the organizing discipline, though the text is for non-majors.

Student Outcomes: Clearly Stated? No

What Teacher Background is Assumed? some physical science would be helpful

Other/General Comments: Though this is a student text, it would be an excellent resource for a teacher to use to review different environmental problems, the ways they relate to each other and to energy issues.

ENERGY MATERIALS EVALUATION

Title: Eco-tips

Author: Concern, Inc. **Issue Date:** 1975

Suggested Grade Levels: jr high school, adult

Suggested Subject Areas: general information

Media types: short pamphlets

General Information

Cost: 30-40 ¢ @

Source: Concern, Inc. 2233 Wisconsin Ave. NW, Washington, D.C. 20007

Energy Topics: conservation tips, energy alternatives, energy technology, energy resources on public lands

Types of Activities: none

Approaches: strong promotion of conservation. Supports solar, opposes nuclear

Student Outcomes: Clearly Stated? No

What Teacher Background is Assumed? none

Other/General Comments: These give a well done summary of environmentalist positions. They have facts well organized, briefly stated and backed with figures.

Title: Energy: A Growing National Problem

Author: National Wildlife Federation **Issue Date:** 1978

Suggested Grade Levels: jr. high and up

Suggested Subject Areas: supplement for social studies, language arts, science

Media Types: 16 page booklet

General Information

Cost: 1 copy free; 20 ¢ in quantity

Source: National Wildlife Federation, 1412 16th St. NW, Washington, DC 20036

Energy Topics: use, sources, conservation

Types of Activities: none

Approaches: brief overview, lots of drawings, emphasizes conservation

Student Outcomes: Clearly Stated? No

What Teacher Background is Assumed? none assumed; glossary included

Other/General Comments: good, brief overview

ENERGY MATERIALS EVALUATION

Title: Energy: From Source to Use

Author: H. S. Stoker, S. L. Seager, R. L. Capener **Issue Date:** 1975

Suggested Grade Levels: high school, adult

Suggested Subject Areas: general information, science

Media Types: 337 page book

General Information

Cost: $5.95

Source: Scott, Foreman & Co., 11310 Gemini Lane, Dallas, Texas 75229

Energy Topics: use, crisis, environment, definition, sources, problems, future alternatives, conservation

Types of Activities: none

Approaches: objective overview of many facets of energy problems

Student Outcomes: Clearly Stated? No

What Teacher Background is Assumed? not much assumed

Other/General Comments: good overview

Title: Energy and Our Future

Author: Joseph M. Oxenhorn **Issue Date:** 1979

Suggested Grade Levels: Jr. High and Sr. High

Suggested Subject Areas: Science

Media Types: 214 pg. book

Student Material

Source: Globe Book Company, Inc., 50 West 23rd Street, New York, N.Y. 10010

Energy Topics: nature of energy, sources, use, historical energy development, future use and alternatives, problems of different sources.

Types of Activities: discussion questions at the end of each chapter.

Approaches: attempts to present a balanced overview of energy problems

Student Outcomes: Clearly Stated? No

What Teacher Background is Assumed? no special background needed, although some of the scientific principles of energy relationships are treated quite briefly

Other/General Comments: good, but nuclear section is somewhat dated by such events as Three Mile Island, and the reassessment of the Rasmussen report; says no one has been killed in a reactor accident, whereas there *have* been some deaths in a military reactor.

ENERGY MATERIALS EVALUATION

Title: Energy Dilemmas

Author: League of Women Voters Education Fund **Issue Date:** 1977

Suggested Grade Levels: high school, adult

Suggested Subject Areas: social studies, general information

Media Types: 39 page pamphlet

General Information

Cost: $1.00/(cheaper in quantity)

Source: League of Women Voters, 1730 M. St. NW, Washington, D.C. 20036

Energy Topics: use, sources, economy, supplies, demand, economic relationships, future policy

Types of Activities: none

Approaches: broad, objective overview of the energy problem

Student Outcomes: Clearly Stated? No

What Teacher Background is Assumed? none assumed

Other/General Comments: This is an excellent, non-technical overview of the energy problem. See also the pamphlet *Energy Options* by the League of Women Voters.

Title: Energy Options

Author: League of Women Voters Education Fund **Issue Date:** 1977

Suggested Grade Levels: high school, adult

Suggested Subject Areas: social studies, general information

Media Types: 55 page pamphlet

General Information

Cost: $1.00/cheaper in quantity

Source: League of Women Voters, 1730 M. St. NW, Washington, DC 20036

Energy Topics: alternatives, use, politics, decision making, future

Types of Activities: none

Approaches: broad, objective overview of energy choices

Student Outcomes: Clearly Stated? No

What Teacher Background is Assumed? none assumed

Other/General Comments: This is an excellent, non-technical overview of the energy problem. See also the pamphlet *Energy Dilemmas* by the League of Women Voters.

ENERGY MATERIALS EVALUATION

Title: Energy Primer

Author: Richard Merrill & Thomas Gage (eds.) **Issue Date:** 1978

Suggested Grade Levels: sr. high, adult

Suggested Subject Areas: general information, industrial arts, science

Media Types: 256 page book

General Information

Cost: $7.95

Source: Dell Publishing Co., 1 Dag Hammerskjold Plaza, 245 E. 47th Street, New York, N.Y. 10017

Energy Topics: definitions, alternative sources of energy (solar, wind, water biomass, wood) solar architecture

Types of Activities: plans for various energy systems

Approaches: catalog of "soft energy path" ideas

Student Outcomes: Clearly Stated? No

What Teacher Background is Assumed? varies with different sections

Other/General Comments: This is a very good resource. It combines short articles with schematic drawings, book reviews, lists of equipment (by brand name), suppliers, and resource lists. It is in the style of *The Whole Earth Catalog*.

Title: From Fossils to Fuels

Author: Hershell and Joan Lowery Nixon **Issue Date:** 1977

Suggested Grade Levels: (see Other, below)

Suggested Subject Areas: science

Media Types: short, unpaged, hardback book

Student Material

Cost: $5.95

Source: Harcourt Brace Jovanovich, 757 Third Avenue, Manhattan, N.Y. 10017

Energy Topics: formation of oil and natural gas, exploration for and processing of these fuels

Types of Activities: none

Approaches: straightforward exploration of fossil fuel origin

Student Outcomes: Clearly Stated? No

What Teacher Background is Assumed? none

Other/General Comments: There are some very sophisticated ideas introduced very briefly (atomic structure, synclines). For some students, there may be a mismatch of the book's format (pictures, large print) with its content and vocabulary. It is well-presented information, but students will probably need help with it.

ENERGY MATERIALS EVALUATION

Title: Going, Going, Gone? The Waste of Our Energy Resources

Author: James Marshall **Issue Date:** 1976

Suggested Grade Levels: jr. high, sr. high

Suggested Subject Areas: social studies, science, general information

Media Types: 94 page book

Student Material

Cost: $5.49

Source: Coward, McCann & Geoghegan, 200 Madison Ave., NY, NY 10016

Energy Topics: use, definitions, crisis, sources, environmental costs, conservation, nuclear, alternatives

Types of Activities: none

Approaches: brief overview about causes of energy crisis, future possible solutions; discusses problems of nuclear; strongly promotes conservation.

Student Outcomes: Clearly Stated? No

What Teacher Background is Assumed? no special background needed

Other/General Comments: good overview

Title: The Homebuilt Wind-Generated, Electricity Handbook

Author: Michael Hackleman **Issue Date:** 1975

Suggested Grade Levels: high school, adult

Suggested Subject Areas: industrial arts

Media Types: 194 page book

General Information

Cost: $7.50

Source: Earthmind, 5246 Boyer Rd., Mariposa, CA 95338

Energy Topics: detailed review of different types and parts of wind generators

Types of Activities: none

Approaches: detailed "how to do it" approach

Student Outcomes: Clearly Stated? No

What Teacher Background is Assumed? some experience working with equipment and tools, math skills

Other/General Comments: very good step-by-step handbook on wind

ENERGY MATERIALS EVALUATION

Title: How Did We Find Out About Nuclear Power

Author: Isaac Asimov **Issue Date:** 1976

Suggested Grade Levels: upper elementary, jr. high

Suggested Subject Areas: science

Media Types: 64 page book

Student Material

Cost: $6.85

Source: Walker and Company, 720 Fifth Avenue, New York, N.Y.

Energy Topics: basic atomic theory, nuclear energy, development of A-bomb.

Types of Activities: none

Approaches: The book leads up to nuclear power use by giving a thorough grounding on atomic principles and history of discoveries.

Student Outcomes: Clearly Stated? No

What Teacher Background is Assumed? doesn't assume any background, but the ending on use of nuclear power could be expanded by supplementary materials.

Other/General Comments: good explanation, but has very little discussion of power generation.

Title: In Search of an Energy Policy

Author: Charles A. Willard **Issue Date:** 1978

Suggested Grade Levels: high school & up

Suggested Subject Areas: debate, social studies

Media Types: 260 page book

Student Material; General Information

Cost: 1 copy — $6.85, 2-9 copies — $4.88

Source: National Textbook Co., 8259 Niles Center Rd., Skokie, Ill. 60077

Energy Topics: how energy policy is formulated, different issues considered in legislative decisions, views of the world

Types of Activities: none, though this is intended as background for debate students

Approaches: The book is an exploration of the background of energy policy making. It calls the crisis political rather than technical, and does an excellent job of supporting that viewpoint.

Student Outcomes: Clearly Stated? No

What Teacher Background is Assumed? no special backgrounds needed, though the teacher may want to examine some of the primary sources mentioned in the many chapter-end footnotes.

Other/General Comments: This is a very well done book, combining consideration of *process* with enough factual material (and references) on energy to be a very valuable resource. The book demands good reading skills.

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ENERGY MATERIALS EVALUATION

Title: Oil and Natural Gas
Author: Betsy Harvey Kraft **Issue Date:** 1978
Suggested Grade Levels: jr. high
Suggested Subject Areas: general information
Media Types: 64 page book
Student Material
Cost: $4.90
Source: Franklin Watts, 730 Fifth Avenue, New York, N.Y. 10019
Energy Topics: history of oil & gas, formation of oil & gas, refining, drilling, conservation
Types of Activities: none
Approaches: straightforward story of how oil and gas were formed, are collected, and are used.
Student Outcomes: Clearly Stated? No
What Teacher Background is Assumed? none necessary
Other/General Comments: good historical overview

Title: The Quest for Oil
Author: W. G. Roberts **Issue Date:** 1977
Suggested Grade Levels: jr. — sr. high
Suggested Subject Areas: general information, careers
Media Types: 158 page book
Student Material
Cost: $9.95
Source: S. G. Phillips, New York, 305 W. 86 Street — New York, N.Y. 10024
Energy Topics: traces history of oil, drilling, use, separation, explorations, transport
Types of Activities: none
Approaches: The book gives quite a bit of detail on the whole oil cycle — from exploration to final use. Some of the statements on controversial issues appear to reflect oil company point of view.
Student Outcomes: Clearly Stated? No
What Teacher Background is Assumed? no specific background, but more material on effects of oil spills on natural systems should be provided. The book takes an extremely optimistic view.
Other/General Comments: a good, in-depth look at oil production

ENERGY MATERIALS EVALUATION

Title: The Race for Electric Power

Author: Jerry Grey **Issue Date:** 1974

Suggested Grade Levels: jr. high, sr. high

Suggested Subject Areas: general information, physical sciences

Media Types: 125 page book

Student Material

Cost: $5.95

Source: Westminster Press, Witherspoon Building, Philadelphia, Pennsylvania 19107

Energy Topics: electricity generation, fuel source

Types of Activities: none

Approaches: This book argues that nuclear generating plants, both fission and breeder, are the best solution to supplying electricity.

Student Outcomes: Clearly Stated? No

What Teacher Background is Assumed? none assumed

Other/General Comments: Grey gives good explanations of how things work. He discounts arguments against nuclear power.

Title: Saving Electricity

Author: Sam and Beryl Epstein **Issue Date:** 1977

Suggested Grade Levels: 4 — 6

Suggested Subject Areas: science

Media Types: 64 page hardback book

Student Material

Cost: $4.22

Source: Garrard Publishing Co., 107 Cherry Street, New Canaan, Ct. 06840

Energy Topics: electricity generation and use, conservation, recycling

Types of Activities: none

Approaches: tells the story of school children learning about electricity and conservation in a power blackout; promotes conservation with specific suggested actions

Student Outcomes: Clearly Stated? No

What Teacher Background is Assumed? none

Other/General Comments: well done presentation of a lot of information.

ENERGY MATERIALS EVALUATION

Title: The Woodburner's Encyclopedia

Author: Fay Shelton & Andrew Shapiro **Issue Date:** 1976

Suggested Grade Levels: high school, adult

Suggested Subject Areas: industrial arts, general information

Media Types: 155 page book

General Information

Cost: $6.95

Source: Vermont Crossroads Press, P.O. Box 333, Waitesfield, Vt. 05673

Energy Topics: principles of safe and efficient woodburning, stove types, different woods, manufacturer's specifications of different stoves, economics of woodburning

Types of Activities: none

Approaches: straightforward, enthusiastic review of woodburning

Student Outcomes: Clearly Stated? No

What Teacher Background is Assumed? not much assumed

Other/General Comments: excellent resource